Effect of Food and Cash Assistance on Food Security for Internally Displaced People in Waimaw Township, Kachin State

ဒီသုတေသနက **ကချင်ပြည်နယ်၊ ဝိုင်းမော်မြို့နယ်က စစ်ဘေးရှောင်စခန်းများမှာ နေထိုင်ကြတဲ့ စစ်ဘေးရှောင်များရဲ့ အစားအသောက်ဖူလုံရေးအပေါ် အစားအစာထောက်ပံ့မှုနဲ့ ငွေကြေးထောက်ပံ့မှုတို့ရဲ့ သက်ရောက်မှုကို** လေ့လာထားတာဖြစ်ပါတယ်။

၁။ ဒေတာ ကောက်ယူခြင်း (Data Collection)

- **ဒေတာအရင်းအမြစ်:** ဒီသုတေသနအတွက် ဒေတာတွေကို **Oxfam** ဆိုတဲ့ အပြည်ပြည်ဆိုင်ရာ အစိုးရမဟုတ်သောအဖွဲ့ (INGO) က ကချင်ပြည်နယ်က စစ်ဘေးရှောင်စခန်း ၅ ခုမှာ လုပ်ခဲ့တဲ့ **အိမ်ထောင်စုစစ်တမ်း (Household Survey)** ကနေ ရယူအသုံးပြုထားပါတယ်။
- **ကောက်ယူပုံ: Survey CTO** လို့ခေါ်တဲ့ အွန်လိုင်း/အော့ဖ်လိုင်း ဒေတာကောက်ယူရေးစနစ်နဲ့ တက်ဘလက်ကွန်ပျူတာများသုံးပြီး မေးခွန်းလွှာတွေကို ဖြေကြားစေခဲ့ပါတယ်။
- **ဘက်လိုက်မှု လျှော့ချခြင်း:** ဒေတာများ တိကျမှန်ကန်စေဖို့ ပေးဝေရေးအစီအစဉ်မှ မဟုတ်တဲ့ **ကချင်ခရစ်ယာန်ဘုရားရှိခိုးကျောင်း (KBC)** ဝန်ထမ်း ၃ ဦးနဲ့အတူ ပြင်ပမှ ဒေတာကောက်သူ ၁၄ ဦးကို စေလွှတ်ခဲ့ပါတယ်။

၂။ နမူနာ ရွေးချယ်ခြင်း (Sampling Method)

- **လူဦးရေ:** စစ်တမ်းကောက်ယူတဲ့ စခန်း ၅ ခုမှာ စုစုပေါင်း **အိမ်ထောင်စု ၁၂၇၉ စု** ရှိပါတယ်။
- **နမူနာအရေအတွက်: Cochran's formula** ကိုသုံးပြီး လိုအပ်တဲ့ နမူနာအရေအတွက်ကို တွက်ခဲ့ပါတယ်။
    - ယုံကြည်ရမှုအဆင့် ၉၅%၊ အတည်ပြုချက်ရဲ့လွဲမှားနိုင်ခြေ ၆.၂% ယူပြီး တွက်ချက်ရာမှာ **နမူနာ အိမ်ထောင်စု ၂၀၉ စု** ရရှိခဲ့ပါတယ်။
- **နမူနာရွေးချယ်နည်းလမ်း: အရွယ်အစားအလိုက် ချိန်ဆပြီး အလွှာခွဲ ကျပန်းနမူနာယူနည်း (Proportionate to Size Allocation Stratified Random Sampling)** ကိုသုံးခဲ့ပါတယ်။
    - စခန်း ၅ ခုကို လွှာ (Stratum) ၅ ခုအဖြစ် ခွဲခဲ့ပါတယ်။

- ပြီးရင် စခန်းတစ်ခုချင်းစီရဲ့အိမ်ထောင်စုအရေအတွက်အလိုက် (စုစုပေါင်းရဲ့၂၀၉ စုထဲက) နမူနာအရေအတွက်ကို ချိန်ဆခွဲဝေပြီး ကျပန်းနမူနာယူခဲ့ပါတယ်။
- ဥပမာ - အိမ်ထောင်စု ၄၆၅ စုရှိတဲ့ Maga Yang စခန်းကနေ နမူနာ ၇၆ စု ယူခြင်းဖြစ်ပါတယ်။

၃။ လေ့လာမည့် အဓိကအရာများ (Key Variables)

- **မှတ်ချက်:** ဒီသုတေသနမှာ **အစားအသောက်ဖူလုံရေး (Food Security)** ကို **အစားအသောက်စားသုံးမှုရမှတ် (Food Consumption Score - FCS)** နဲ့ တိုင်းတာထားပါတယ်။
- **Dependent Variable:**
  - **အစားအသောက်ဖူလုံရေး (Food Security)** - FCS ရမှတ်ကို အခြေခံပြီး အုပ်စု ၃ စုခွဲထားတယ်။
    1. **ဆိုးဝါး (Poor)** - ရမှတ် ၀ မှ ၂၁
    2. **အနည်းငယ် (Borderline)** - ရမှတ် ၂၁.၅ မှ ၃၅
    3. **လက်ခံနိုင်သော (Acceptable)** - ရမှတ် ၃၅ ထက်မြင့်
- **Independent Variables:** ဒီအချက်တွေက အစားအသောက်ဖူလုံရေးအပေါ် သက်ရောက်မှုရှိမရှိ လေ့လာတဲ့အချက်တွေဖြစ်တယ်။
  - **ထောက်ပံ့ရေးဆိုင်ရာ:** အစားအစာ လုံလောက်မှုရှိမရှိ၊ အရည်အသွေးနဲ့ ကျေနပ်မှုရှိမရှိ၊ နှစ်သက်ရာ အစားအစာစားနိုင်မှုရှိမရှိ။
  - **လူမှုရေးဆိုင်ရာ:** အမျိုးသမီးဦးဆောင်အိမ်ထောင်စုလား၊ အိမ်ထောင်ရှင်ရဲ့ အိမ်ထောင်ရေးအခြေအနေ၊ အိမ်ထောင်စုဝင်အရေအတွက်၊ အိမ်ထောင်စုထဲမှာ နေရပ်စွန့်ခွာလာသူ (migrant) ရှိမရှိ။

- **စီးပွားရေးဆိုင်ရာ:** အိမ်ထောင်စု၏ လစဉ်ဝင်ငွေ၊ ဝင်ငွေရရှိမှုနည်းလမ်းတစ်ခုထက်မကရှိမရှိ၊ အစားအသောက်ပေါ်အများဆုံးသုံးစွဲမှုရှိမရှိ။

၄။ ဒေတာ ခွဲခြမ်းစိတ်ဖြာခြင်း နည်းလမ်းများ (Data Analysis Methods)

သုတေသနရဲ့ ရည်မှန်းချက်တွေကို ဖြေရှင်းဖို့ နည်းလမ်း ၃ မျိုးသုံးထားပါတယ်။

- **(က) တစ်ခုတည်းသော ခွဲခြမ်းစိတ်ဖြာမှု (Univariate Analysis):**
  - **ဘာလဲ:** လေ့လာထားတဲ့ အချက်အလက်တစ်ခုချင်းစီရဲ့ အခြေခံအချက်အလက်တွေကို ဖော်ပြဖို့ဖြစ်တယ်။
  - **သုံးတဲ့နည်းလမ်း:** ကြိမ်နှုန်းဇယား (Frequency Tables)၊ ရာခိုင်နှုန်းများ၊ ပျမ်းမျှ (Mean)၊ စံချွန် (Standard Deviation) စတာတွေကို တွက်ချက်ပြသထားတယ်။
  - **ဥပမာ:** အိမ်ထောင်စုဝင်ပျမ်းမျှအရေအတွက်၊ ပျမ်းမျှဝင်ငွေ၊ FCS ရမှတ်အဆင့်တွေရဲ့ ရာခိုင်နှုန်းတွေကို ဖော်ပြထားတယ်။
- **(ခ) ဒွိအချက်အလက် ခွဲခြမ်းစိတ်ဖြာမှု (Bivariate Analysis):**
  - **ဘာလဲ:** အစားအသောက်ဖူလုံရေးနဲ့ အခြားအချက်တစ်ခုခု (ဥပမာ - ထောက်ပံ့မှု၊ ဝင်ငွေ) အကြား **ဆက်နွယ်မှုရှိမရှိ** စစ်ဆေးဖို့ဖြစ်တယ်။
  - **သုံးတဲ့နည်းလမ်း: Pearson's Chi-Square Test** - ဒီစမ်းသပ်ချက်က categorical (အမျိုးအစားခွဲခြားထားသော) အချက်နှစ်ခုကြား ဆက်စပ်မှုရှိမရှိ စစ်ဆေးပေးတယ်။
  - **ဥပမာ:** အမျိုးသမီးဦးဆောင်အိမ်ထောင်စုတွေမှာ အစားအသောက်ဖူလုံရေး ပိုကောင်းသလားဆိုတာကို စစ်ဆေးတာ။
- **(ဂ) Multivariate Analysis:**

- **ဘာလဲ:** အချက်အလက်အများအပြားကို တစ်ချိန်တည်းမှာ ထည့်သွင်းစဉ်းစားပြီး အစားအသောက်ဖူလုံရေးအပေါ် **ဘယ်အချက်တွေက သိသိသာသာ သက်ရောက်မှုရှိလဲ** ဆိုတာကို လေ့လာဖို့ဖြစ်တယ်။
- **သုံးတဲ့နည်းလမ်း: Ordered Logistic Regression Model** - ဒီမော်ဒယ်ကို ကျေးဇူးပြုအကျိုးသက်ရောက်မှု (FCS အုပ်စု ၃ စု) က အဆင့်လိုက်ရှိတဲ့အခါ (Poor -> Borderline -> Acceptable) မှာ သုံးတယ်။ ဒီမော်ဒယ်က လေ့လာထားတဲ့ အချက်တစ်ခုခုက (ဥပမာ - ဝင်ငွေ တိုးလာတဲ့အခါ) အစားအသောက်ဖူလုံရေး ပိုကောင်းလာနိုင်ခြေ (Odds Ratio) ဘယ်လောက်ရှိလဲဆိုတာကိုပါ တွက်ချက်ပေးတယ်။

၅။ အဓိက တွေ့ရှိချက်များ (Key Findings from Methodology)

- ဒီနည်းလမ်းတွေနဲ့ ခွဲခြမ်းစိတ်ဖြာကြည့်ရာမှာ **ထမင်းနဲ့ငွေကြေး ထောက်ပံ့မှုဟာ စစ်ဘေးရှောင်တွေရဲ့အစားအသောက်ဖူလုံရေးကို သိသိသာသာ မသက်ရောက်ကြောင်း** တွေ့ရပါတယ်။
- **အိမ်ထောင်စုရဲ့စီးပွားရေးအခြေအနေ (ဝင်ငွေ၊ ဝင်ငွေရရှိမှုနည်းလမ်းများပြားမှု)** ကသာ အစားအသောက်ဖူလုံရေးကို သိသိသာသာ အဓိကလွှမ်းမိုးနေတယ်လို့ ဆိုလိုပါတယ်။

အတိုချုပ်ပြောရရင် ဒီသုတေသနက မေးခွန်းလွှာပြုစုမှုကနေ နမူနာယူမှု၊ ဒေတာခွဲခြမ်းစိတ်ဖြာမှုအထိ စနစ်တကျ ဆောင်ရွက်ထားတဲ့ သုတေသနတစ်ခုဖြစ်ပြီး စစ်ဘေးရှောင်ပြဿနာကို ဖြေရှင်းရာမှာ ထောက်ပံ့မှုထက် စီးပွားရေးဖွံ့ဖြိုးတိုးတက်ရေးကို ဦးစားပေးသင့်ကြောင်း အကြံပြုထားတာကို တွေ့ရမှာဖြစ်ပါတယ်။

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DEPARTMENT OF STATISTICS

MASTER OF APPLIED STATISTICS PROGRAMME

EFFECT OF FOOD AND CASH ASSISTANCE ON FOOD SECURITY FOR INTERNALLY DISPLACED PEOPLE IN WAIMAW TOWNSHIP, KACHIN STATE

KHINE SHWE TUN

MAS - 13

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This thesis is submitted to the Board of Examination as partial fulfillment of the requirements for the Degree of Master of Applied Statistics

Approved by the Board of Examiners

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ABSTRACT

This study has attempted to explore the impact of food assistance programs on the food security of the beneficiaries in the Internal Displaced Peoples (IDPs) in Kachin State. To meet the study objectives, the household survey conducted by Oxfam, an International Non-Governmental Organization to evaluate the intervention of food and cash assistance programs, are employed. In this study, the univariate, bivariate and multivariate methods were applied. The univariate analysis is used to describe the summary statistics. Furthermore, Pearson's Chi-Squares statistic is used to investigate the association between food assistance and food security. Besides, the ordered logistic regression model is employed to investigate which social-economics and distribution program were influencing the food security of IDPs. From the findings, there is no evidence for an association between food assistance and food security. In contrast, economic scenarios of the IDPs households play an essential role in achieving their food security.

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CONTENTS

ABSTRACT i
ACKNOWLEDGEMENTS ii
CONTENTS iii
LIST OF TABLES vi
LIT OF ABBREVIATIONS vii

CHAPTER

I INTRODUCTION

1.1 Rationale of the Study 1
1.2 Objectives of the Study 3
1.3 Method of Study 3
1.4 Scope and Limitations of the Study 3
1.5 Organization of the Study 3

II LITERATURE REVIEWS

2.1 Definition of Food Security 5
2.2 Definition of Food Insecurity 5
2.3 Relationships Between Food Security and Food Insecurity 6
2.4 Review of Related Literature on Food Security 6
2.5 Impact of Cash Transfer Intervention on Food Security 9
2.6 Cash based Approaches in Humanitarian Emergencies 11
2.7 Food Availability in the Internal Displaced People Camps 11
2.8 Conceptual Framework for the Study 12
2.9 Definitions of Variables Used in this Study 13

III METHODOLOGY

3.1	Survey Design	15
3.1.1	Determination of the Sample Size	15
3.1.2	Sampling Design	17
3.2	Measurement of Food Consumption Score	17
3.3	Procedure of Food Consumption Score	18
3.4	Determinations of the Weight	21
3.5	Process of Quality Control on the Food Security Survey	23
3.6	Pearson's Chi-square Statistic	23
3.7	Ordered Logistic Regression Model	25
3.8	The Odds Ratio	28
3.9	Testing for the Significance of the Model	29

IV DATA ANALYSIS

4.1	Demographic Characteristics of Respondents	31
4.2	Economic Characteristics of Respondents	33
4.3	Background of Food Assistance, Food Consumption, and Food Security	35
4.4	Association between Food Security and Food Assistance, Socio-Economic and Demographic Factors	36
4.5	Effect of Food Assistance on Food Security	38
4.5.1	Ordered Logistic Regression Diagnosis Test	38
4.5.2	Model Fitness	39
4.5.3	Effect of Food and Cash Assistance on Food Security	40

V CONCLUSION

5.1 Findings 43

5.2 Recommendations 44

REFERENCES

APPENDICES

LIST OF TABLES

Table	Title	Page
Table (3.1)	Listed of Selected Camps and Number of Households in Kachin State	16
Table (3.2)	Measurement of the Study	18
Table (3.3-A)	Weight of Food Items	21
Table (3.3-B)	Weight of Food Items and Justification	22
Table (3.4)	Food Consumption Threshold	23
Table (4.1)	Frequency Distribution of Women-headed	31
Table (4.2)	Frequency Distribution of Marital Status of Household Head	31
Table (4.3)	Frequency Distribution of Household Members	32
Table (4.4)	Frequency Distribution of Household with Sick People	32
Table (4.5)	Frequency Distribution of Households with Migrants	32
Table (4.6)	Frequency Distribution of Monthly Household Income	33
Table (4.7)	Frequency Distribution of Household with people who cannot work	33
Table (4.8)	Frequency Distribution of Household with Debt	33
Table (4.9)	Frequency Distribution of Maximum income and No income	34
Table (4.10)	Demographic and Economic Characteristics	34
Table (4.11)	Background of Food Assistance, Food Consumption and Food Security	36
Table (4.12-a)	Association between Food Security and Food Assistance, Socio-Economic	37
Table (4.12-b)	Association between Food Security and Food Assistance, Socio-Economic	38
Table (4.13)	Test of Parallel Lines	39
Table (4.14)	Model Fitting Information	39
Table (4.15)	Goodness-of-Fit	40
Table (4.16)	Pseudo R-Square	40
Table (4.17)	Effect of Food Assistance on Food security	41

LIST OF ABBREVIATIONS

CTs	Cash Transfers
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
FDP	Food Distribution Point
FGD	Focus Group Discussion
FH	Food for Hungry
FHH	Female-headed household
FINS	Food Insecurity
FSNAU	Food Security and Nutrition Analysis Unit (FAO)
GAM	Global Acute Malnutrition
GCA	Government Control Area
HDDS	Household Dietary Diversity Score
HH	Household
IDP	Internal Displaced persons
INGO	International Non-Governmental Organization
Kg	Kilograms
LICS	Low-income countries
NGCA	Non-Government Control Area
OiM	Oxfam in Myanmar
PDM	Post-distribution monitoring
PSNB	Productive Safety Nets Program
SGBV	Sexual and gender Based Violence
SID	Scientific Information Database
SPSS	Statistical Package for Social Science
UNICEF	The United Nations Children's Fund
USAID	United States Agency for International Development
VAM	Vulnerability and Assessment Mapping
WFP (UN)	World Food Programme
WHO	World Health Organization

CHAPTER I
INTRODUCTION

Over 820 million people suffering from hunger according to new United Nations (2019) report. Hunger is increasing in many countries where economic growth is lagging, particularly in middle-income countries and those that rely heavily on international primary commodity trade. It is well recognized that household food insecurity is one of the three underlying causes of malnutrition. Food security was defined in its most basic form as physical, social and economic access by all people at all times to sufficient and safe foods which meets their dietary needs and food preferences for an active and healthy life. Thus, food insecurity exists when people lack access to sufficient amounts of safe food and are therefore not consuming the food required for normal growth and development, and for an active and healthy life. This may be due to the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate utilization at household level. It is difficult to know how many households or even individuals are food and nutrition insecure, given the multiple dimensions (chronic, transitory, short-term and long-term) of food and nutrition insecurity and intra-household inequalities of differing natures in different regions.

1.1 Rationale of the Study

Food security is a very important for individual, household, national, regional and global level. It provides physical and economic access to adequate, safe and nutritious food, an active and healthy life to fulfill for all people. In other words, food insecurity needs the sufficient food, minimum dietary and deprivation. Nowadays, food insecurity is a great problem in South Asia. In South Asia, India, Nepal and Bangladesh are faced with situation of food insecurity. It is a major problem of all regions and countries around the world. In Myanmar, Kachin State has been suffering from arm conflicts. Due to conflicts, many local people become displaced and food insecurity problem. After resuming the conflicts in 2011, around 100,000 people have been displaced in the border area of China. Besides, as of mid-2016, fighting continues and in many cases, is intensifying in Kachin, causing further displacement of people. IDPs are situated predominantly in IDP camps, both in Non-Government-Controlled Areas (NGCA used hereafter) and Myanmar Government-Controlled Areas (GCA). In NGCA, IDPs tend to

be located more remotely and in rural areas with particularly limited livelihood opportunities, whereas IDPs in GCA are more likely to be in urban settings with better livelihood opportunities and market access.

Kachin State has many micro contexts resulting from geography, governance systems and proximity to conflict, meaning the situations for each IDP camp can vary significantly. Some instances of return and/or resettlement have taken place, but ongoing conflict, proximity to military bases and landmines remain major barriers (amongst many) to further returns. Thus, IDPs remain in camps and humanitarian assistance remains critical. The international aid bodies have been supporting a variety of in-kind and cash assistance to the internally displaced persons (IDPs used hereafter).

Food security for IDPs is one of the critical components for saving lives. Since they have been living in the IDP camps, they do not have access to cultivated lands, job opportunities, and livelihoods incomes. They rely on external relief and assistance as long as they stay in the IDP camps. Since 2013, Food assistance have been supported over 5,860 IDPs across five camps in Kachin State, namely Sha. It Yang, Maga Yang, Pajau / Jan Mai, Hkau Shaung (BP 12), and Hpare Hkyer - BP6 from Waingmaw and Chipwe townships where camps are in the remote border areas with limited functioning markets and livelihood opportunities. This program aims to achieve ensuring the food security of targeted people. Provision of in-kind food ration is calculated based on World Food Program standards and each IDP is provided 13.5 kg of rice, 1.8 kg of chickpeas, one liter of oil and 0.15 kg of salt per month.

Throughout programing, cash feasibility assessment was conducted by Oxfam, International Non-Governmental Organization, in October 2016 and Cash transfer has been shifted to a more targeted intervention where rice is provided to IDPs in all those five camps: Hkau Shaung (BP12) , Maga Yang, Pajau/Jan Mai, Shalt Yang and Hpare Hkyer camps.

In Hkau Shaung (BP12) camp, rice, salt, oil and pulse were distributed for the internal displaced people. Rice and cash were distributed for the internal displaced people in Maga Yang, Pajau/Jan Mai, Shalt Yang and Hpare Hkyer camps.

Although the aids have been provided for a long term, there is a lack of correlational research investigating how cash and food aids are affecting beneficiaries' food security yet. Therefore, this study has sought to inquire whether the cash and food aids have an impact on beneficiaries' food security in the Internally Displaced People (IDPs) camps in Kachin State.

1.2 Objectives of the Study

The objectives of the study are as follows:

- To examine the demographic and social-economic characteristics of the respondents.
- To investigate the association between food security, food assistance, socio-economic and demographic factors
- To explore the significant effect of cash and food aids on food security.

1.3 Method of Study

This study is from the household survey conducted by Oxfam, International NGO in the IDP camps in Kachin State. There are 1279 households in the IDP camps in Kachin State. In this study, 209 households were chosen from 1279 households by using proportionate **to size allocation stratified random sampling** method. The post-distribution monitoring data was collected through structured individual household (HH) interviews by using Survey CTO, online data collection platform and mobile electronic tablets. To minimize bias of information, 14 external enumerators collected the data accompanied by 3 Kachin Baptist Convention staff who are not from the food and cash distribution program. Descriptive statistics was used to examine the demographic and social-economic characteristics of the respondents. Pearson's Chi-Squares statistic, Ordered Logistic Model were employed to investigate which social-economics and distribution program were influencing the food security of IDPs.

1.4 Scope and Limitations of the Study

The study focuses on the impact of food and cash assistance on food security of the Internally Displaced People in Kachin State which are beneficiaries of food assistance and cash transfer programs of Oxfam, INGO. The study has some limitations as follows. Since the data is not collected with a particular purpose to investigate the effect of food assistance on food security and collected with the purpose to evaluate the intervening program. Hence, a few variables into consideration to elaborate on the effect of food assistance can be taken in this study.

1.5 Organization of the Study

This thesis is organized into five chapters. Chapter I is an introduction which is comprised of five sub-headings: rationale of the study, objectives of the study, method of study, scope and limitations of the study and organization of the study.

Chapter II is literature review and comprised of four sub-headings: review of related literature on food security, impact of cash transfers on food consumption, cash based approaches in humanitarian emergencies, food availability in the internal displaced people camps, conceptual framework for the study.

Chapter III explains the methodology: survey design, identifying sample size, measurements and procedure of the food consumption score, process of quality control on the food security survey, Pearson's Chi-square Statistic, Ordered Logistic Model, the odds ratio, and testing for the significance of the model.

Chapter IV describes the data analysis consisted of subheadings: demographic and socio-economic characteristics, background of food assistance, food consumption and food security, association between food security and food assistance, socio-economic demographic factors, effect of food assistance on food security, ordered logistic regression diagnosis test and model fitness.

Chapter V is the conclusion with findings and recommendations of this study.

CHAPTER II

LIERRATURES REVIEWS

In this chapter, review of related literature on food security, impact of cash transfer intervention on food security, cash□based approaches in humanitarian emergencies, food availability in the internal displaced people camps and conceptual framework for the study are described.

2.1 Definition of Food Security

The current widely accepted definition of food security came from the Food and Agriculture Organization (FAO) annual report on food security "The State of Food Insecurity in the World 2001": Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002).

2.2 Definition of Food Insecurity

The definition of Food Insecurity (FINS) is "whenever the availability of nutritionally adequate and safe foods, or the ability to acquire acceptable foods in socially acceptable ways, is limited or uncertain" (Expert Panel, 1990). Food insecurity, as practically measured in the United States, is experienced when there is (1) uncertainty about future food availability and access, (2) insufficiency in the amount and kind of food required for a healthy lifestyle, or (3) the need to use socially unacceptable ways to acquire food (National Research Council, 2006). However, with the emphasis on health equity, focus should be given to the people under the most disadvantaged conditions such as floods, droughts, conflicts and wars. There is also urgent demand for better coping strategies for food insecurity. When speaking of food insecurity, what comes to mind quickly is malnutrition, hunger and the absence of food in the house or the local markets. This could be the main reason why the measurement of food insecurity seems to be inclined towards these aspects. Indicators of malnutrition – as determined by anthropometric surveys, caloric intake and food consumption (dietary diversity), incidences of hunger and food prices, feature highly in the literature on food insecurity measurement.

2.3 Relationships Between Food Security and Food Insecurity

Food security and food insecurity are dynamic, reciprocal and time dependent and the resultant status depends on the interaction between the stresses of food insecurity and the coping strategies to deal with them. The stresses of food insecurity may occur at any point along the food security pathway – Availability, Accessibility, Utilization and Stability. The elicited coping responses may take place at the national, household or individual levels. The two processes are inter-related linearly with re-iterative feedback loops such that stress leads to coping responses that may or may not be adequate, thereby requiring modifications in the coping strategies until food security is regained.

2.4 Review of Related Literature on Food Security

Maxwell (1995) believed that most food security analysts resort to measuring food consumption to escape the difficulty involved in making "complete analysis" of household food security; considering complexities surrounding household composition versus their resource-based income. Whereas this range of indicators directly provides information on the magnitude and the presence or absence of the problem, by themselves they leave out more of the information in concluding potential problem or an underlying risk.

Chung et al., (1997) noted that the authors cited above resoundingly see the need to finding simple and realistic measure of household food insecurity that can be labelled as "golden rule" combining rigour and statistical efficiency to conclude food insecurity from the household level upwards.

Riely, et al. (1999) investigated the importance of food security information which goes beyond program monitoring and impact evaluation to "the design of relief and development interventions" and explored some of the most commonly used indicators by food security programs as: food production; income; total expenditure; food expenditure; share of expenditure on food caloric consumption and nutritional status. More so, such traditional way of measurement only tells one side of the story and fails to address possible effects of food insecurity. This could be the reason why existing food insecurity measurement methods and approaches are not planning-oriented but rather are tailored to monitoring and evaluation of programs. Consequentially, the population is rendered unaware of a potential food insecurity risk awaiting them. Review

of literature in this study is therefore streamlined to probe what is documented to reinforce these arguments.

Hoddinott (1999) noticed that the value of household-based measurement of food insecurity in terms of the need to "identify the food insecure" by assessing the severity of food insufficiency and to "characterize the nature of their insecurity". The lack of standardized measure of food insecurity has remained an issue of concern to many a food security analyst.

Wolfe and Frongillo Jr. (2000) distinguished that finding a method to best measure food insecurity has been "a subject of much debate". They argue that this is partly due the difficulty related to defining food insecurity, which does not only include the well-publicized composite components of lack of availability, access and utilization but also perceptions about uncertainties of food insecurity.

Bickel, et al (2000) examined that "food security is an essential, universal dimension of household and personal well-being" and that food security and hunger are "possible precursors to nutritional, health, and developmental problems".

Daniel Maxwell et al., (2003) studied that households are also referred to as "the social institutions through which individuals access food". Key among the reasons for treating a household as the unit of analysis is that it is a social unit. Although individual members of the household could have different characteristics and attributes relating to food security, households have many aspects that qualify them to be treated as units of analysis. It is incontestable that wellbeing and hunger are attributes tying well with the individual person or the household that binds them and where they commonly share livelihoods entitlements and endowments. This therefore underpins the call for finding a measure that summarily concludes household food insecurity with high statistical accuracy and efficiency.

Featuring prominently among the reasons that qualify a household as a unit of analysis is sampling based on a sample frame obtainable from census offices. Furthermore, as is often defined in population and housing census training manuals, a household encompasses people who usually share food (meals), shelter and other livelihood assets and has a head. Of overriding importance, in our view, is the fact that the household readily yields quantitative data as opposed to other forms of data collection, which are heavily dependent on qualitative approaches.

Nandy, et al, (2003) observed a strong association between severe child malnutrition and ill-health. A number of food security experts have highlighted different purposes for measuring household food insecurity. Here focus is on the intervention monitoring purpose of household measurement. Human nutrition practitioners see the value of household food security measurement through the lens of their own domain. That is, to be able to monitor food utilization at household level. Public health practitioners and leading international health organizations, such as UNICEF and WHO, are interested in information on mortality and morbidity especially of mothers and under-five children.

Coates, (2003) considered that the complexity of food security, as a crosscutting discipline, has engrossed the challenge to finding a summative (or 'gold standard') measure of household food insecurity.

Webb, et al. (2006) detected that a number of agencies lack a method for distinguishing households in terms of their food security levels so that they can target and evaluate their programmes reliably. FAO's Hartwig de Haen, speaking at the closure of the International Scientific Symposium on Measurement and Assessment of Food Deprivation and Undernutrition points out that analysis of food insecurity still lacks "a perfect single measure that captures all aspects of food insecurity" (FAO-FIVIMS, 2002). The USAID-funded Food and Nutrition Technical Assistance (FANTA) (2003) includes thirty-three indicators in its recommended list of indicators for measuring food insecurity access alone.

The study has outlined a number of food insecurity indicators described in a number of food security publications, featuring observations and findings of food security experts, academics and researchers. The search resulted in distribution of food insecurity indicators into five categories, namely; food sufficiency, food access, food utilisation, vulnerability and resilience to shocks and stresses.

David Dawe, Cristian Morales-Opazo, Jean Balie, Guillaume Pierre, (2015), mentioned that domestic price data (adjusted for inflation) from a large range of low- and middle-income countries shows that domestic staple food prices were higher in 2013 than they were in the first half of 2007: consumption-weighted real domestic rice, wheat and maize price indices increased by 19, 19 and 29 percent, respectively. The domestic price indices broadly follow world price movements, but domestic price changes are attenuated to an important extent due to government policies, transport costs, changes in exchange rates and other factors. While world price changes thus overstate the impact on

food security of farmers and consumers, the observed increases in domestic prices are still substantial for the poor. Domestic price changes have varied widely across countries, and the changes in any particular country are not necessarily due to changes in world market prices.

2.5 Impact of Cash Transfer Intervention on Food Security

"Social protection" encompasses a broad set of public and private systems for protecting people against risks to their livelihoods and keeping them from falling into (or deeper into) poverty. Engender long-term, sustainable development processes in the hope of providing opportunities for people to move out of poverty and achieving higher standards of living can be achieved through interventions that invest in assets, including the health, nutrition and education of children and adults, and improved social status and rights. In addition, social protection can be seen as contributing to growth through investments in human capital, development of infrastructure, strengthening of markets, and maintenance of political stability.

Cash transfers (CTs) are increasingly popular social protection mechanisms used by many developing countries to improve the food security and nutritional status of lower socio-economic groups. These programs aim not only to alleviate current poverty through income transfers but also to reduce future poverty by encouraging investment(s) in human capital, education, health and nutrition. The overall objective of the program can, therefore, be seen as preventing the intergenerational transmission of poverty. Cash Transfers are given to poor and vulnerable people with no restrictions on how the cash is spent, and no requirements beyond meeting the eligibility criteria (for example, being poor, orphan, or over 60 years of age). The primary objective is to protect current consumption or food security. Research to date has been more successful in showing short-term impacts on human capital; however, there is not much data available on achievement of the broader goal. A review conducted by the World Health Organization (WHO) on several CT programs provided strong evidence of a positive impact on the use of health services, nutritional status and health outcomes, which are assessed by anthropometric measurements and self-reported episodes of illness, respectively. It is hard to attribute these positive effects to the cash incentives specifically because other components may also contribute.

A review of the literature was performed centered on the guiding question: "Are CT programs capable of affecting the food security of the recipient households?" Concerning the inclusion criteria performed in the developing countries and published in any language, containing at least one outcome related to food and nutritional security of the beneficiary population using Pub Med, Iran Medex, SID (Scientific Information Database), ISI (Information Sciences Institute) database, INP (Iran's Nutrition Publication) Abstracts, IRANDOC and Magiran. Both clinical (random or otherwise) and observational (cross sectional, longitudinal, with and without control group) studies published within 1990-2015 were included.

Based on the findings of the reviewed papers, one of the strongest and most consistent findings regarding the impact of CT programs is their contribution to reducing hunger and food insecurity. Regardless of the form of transfer, households receiving transfers average significantly higher spending on and consumption of food. The impact of CTs on hunger has been most pronounced in low-income countries (LICs) where poverty is generally more severe. In these settings, households receiving additional income are particularly likely to prioritize spending on improving the quantity and/or quality of food consumed. For example, in Ethiopia, the Productive Safety Nets Program (PSNP) has improved food security in 7.8 million people who were previously depended on emergency relief. The program operates in 300 rural districts facing chronic food shortage and provides food or cash to those unable to participate in public works. Three quarters of the participants consumed higher quantity and quality of food compared to the previous year, and 60 percent had avoided selling off their productive assets to buy food. Households receiving cash had better dietary diversity than those receiving food, suggesting that CTs may be more effective.

In sum, CT programs have the potential to result in a range of benefits, from reducing extreme poverty to effective support for broader human development objectives, including better nutrition, as well as health and education outputs and outcomes. The extent to which programs deliver these different impacts will depend critically on the availability of complementary services, the local context, and the specifics of program design, including the transfer value. There is some, more limited, evidence that well-designed CT programs can contribute to women's empowerment, local economic activity, strengthening the 'contract' between the citizens and the state,

and supporting climate change adaptation. This is principally a result of needing to focus more in these areas in program monitoring and evaluation, rather than a failure to find results in these areas in existing evaluations

2.6 Cash based Approaches in Humanitarian Emergencies

Cash transfers and vouchers may improve household food security among conflict-affected populations and maintain household food security among food insecure and drought-affected populations. Cash transfers led to greater improvements in dietary diversity and quality than food transfers, but food transfers are more successful in increasing per capita caloric intake than cash transfers and vouchers. Cash transfers may be more effective than vouchers in increasing household savings, and equally effective in increasing household asset ownership. Mobile transfers may be a more successful asset protection mechanism than physical cash transfers. Cash transfers can be an efficient strategy for providing humanitarian assistance. Cash transfer programmes have a lower cost per beneficiary than vouchers which, in turn, have a lower cost per beneficiary than in-kind food distribution. Cash transfer programs can also benefit the local economy. Voucher programmes generated up to $1.50 of indirect market benefits for each $1 equivalent provided to beneficiaries and cash transfer programmes generated more than $2 of indirect market benefits for each $1 provided to beneficiaries. Intervention design and implementation play a greater role in determining the effectiveness and efficiency of cash-based approaches than the emergency context or humanitarian sector. Factors which influence implementation include resources available and technical capacity of implementing agencies, the resilience of crisis-affected populations, beneficiary selection methods, use of new technologies, and setting-specific security issues, none of which are necessarily unique to cash-based interventions.

2.7 Food Availability in the Internal Displaced People Camps

In all the camps humanitarian aid is the major source of staple and contributes towards more than 50 % of the household food. However, source of fresh food (vegetable, fruits, egg and meat) varies among different subgroups. The typical diet includes two main meal, that constitute of heavy breakfast at around 8 o'clock and early dinner at around 5 o'clock. In between two main meals they take snacks and tea. They

have limited dietary diversity and typical diet includes 3 varieties. Main meal includes rice, egg/vegetables and soup. Meat and fish are consumed from the wild sources and when they have better income or when they receive cash grant. Market and home gardening are the only source of fresh food for some camps. The contribution of home garden in small camps ranges from 0- 4 % whereas despite restriction from the church authority to do livelihood activities inside camp premises, home garden contributes for 10 % of the food source in some camps. However, IDPs in large camps with enough open space for home gardening few IDPs families (around 1/3rd of the IDP families) are engaged in producing own food and it contributes for 20% of the total household food and also towards income for 18% IDP families. Hence, all the food in small camps are from the external sources in cash grant supported area whereas in non-cash grant supported area even the IDPs in small camp have diverse food sources.

2.8 Conceptual Framework for the Study

The study aimed to explore presence of a relationship between different explanatory variables (household characteristics and endowments) and outcome variables (food security index and incidence of household recovery from food security shock). In other words, the study attempts, using the data from the Oxfam in Myanmar, INGO, to take food security and household economy analysis to another level: to identify what could be the most influential determinants of household food insecurity in Kachin IDP camps. In this study, the independent variables are sufficient assistance of food, satisfaction with food quality, eating preferred food, income sources of the households, expenditure in highest amount on food, women-headed household, marital status of household head and the dependent variable is food consumption score. The conceptual framework of the study is presented diagrammatically in Figure (1.1)

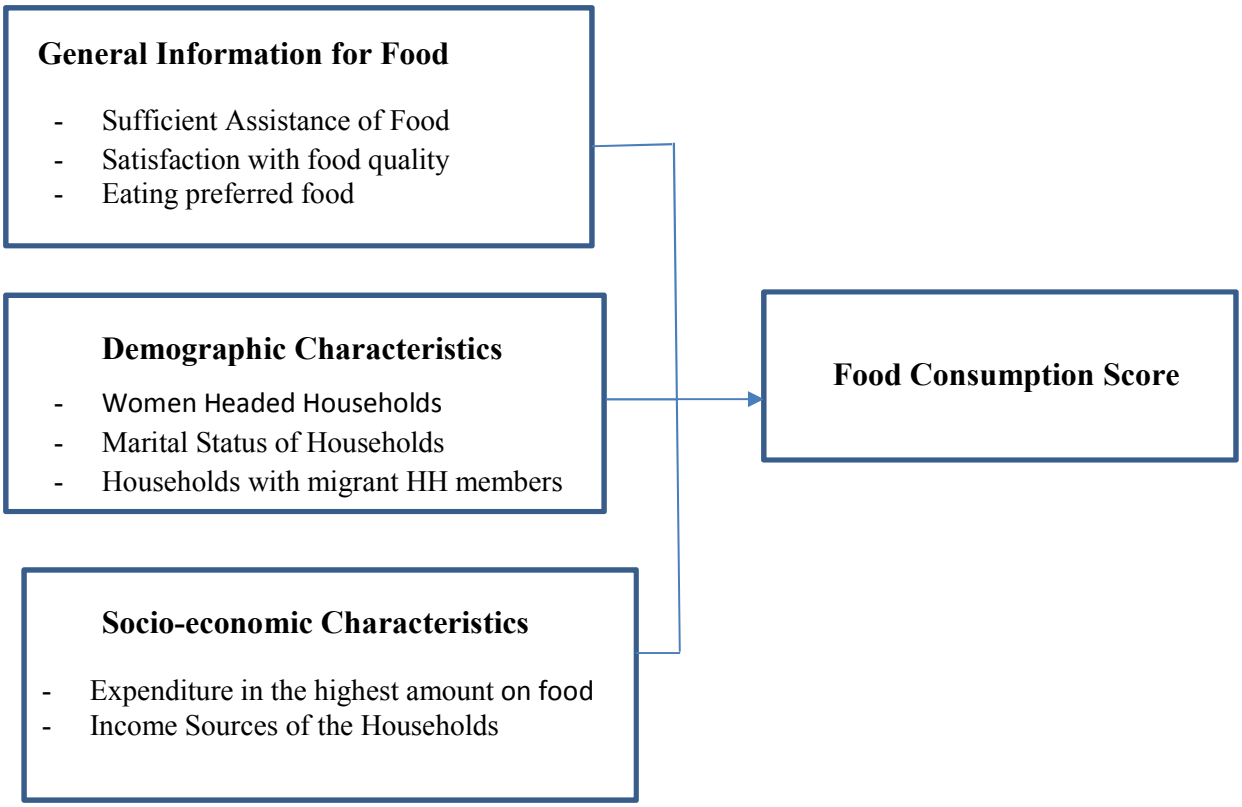
Independent Variables
Dependent Variable
General Information for Food
- Sufficient Assistance of Food
- Satisfaction with food quality
- Eating preferred food
Demographic Characteristics
- Women Headed Households
- Marital Status of Households
- Households with migrant HH members
Socio-economic Characteristics
- Expenditure in the highest amount on food
- Income Sources of the Households
Food Consumption Score

Figure (1.1) Conceptual Framework of the Study

Source: WFP Guideline

2.9 Definitions of Variables Used in this Study

Sufficient Assistance of Food

Sufficient assistance is the household members can eat the food sufficiently regardless of whether adults or children are in their households. They received enough food for their family members.

Satisfaction with Food Quality

Satisfaction with food quality is the level of satisfaction with the food received by the organization. This variable is the perception of the respondents on the food quality.

Eating Preferred Food

Eating preferred food is the communities can eat their preferred food. Their eating food is the food that they would like in their households.

Women Headed Households

Household in which an adult female is the sole or main income producer and decision-maker.

Marital Status of Households

Marital status is the legally defined marital state. There are several types of marital status: single, married, widowed, divorced, separated and, in certain cases, registered partnership.

Households with migrant HH members

Person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons.

Expenditure in the highest amount on food

The Households spend the highest amount on food. In the past month, food was the greatest HH expenditure in order of importance.

Income Sources of the Households

Income sources refer to the various ways individuals and households earn money to support their lifestyles, save for the future, and achieve their financial goals.

Food Consumption Score

The “Food consumption score” (FCS) is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. There are standard weights for each of the food groups that comprise the food consumption score

CHAPTER III

METHDOLOGY

Firstly, this chapter describes the survey design, determination of the required sample size for collecting of data. And then, measurement and the procedure of food consumption score, and determination of the weight and process of the quality control of food security survey are presented. Finally, descriptive statistical techniques such as Pearson's Chi-square statistic and ordered logistic regression model are illustrated for the data analysis.

3.1 Survey Design

The data were collected through structured individual interviews by using Survey CTO (On/Offline Data Collection Platform) and electronic tablets. To *minimize bias*, 14 external enumerators collected the data accompanied by 3 KBC staff who are not from the food and cash distribution program. The Oxfam Monitoring, *Evaluation, Accountability* and Learning Manager developed the data collection tool and trained the enumerators. The survey was conducted by Oxfam, NGO and covered by 5 camps in Kachin state. These are Sha It yang, Maga Yang, Pajau/Jan Mai, Hkau Shaung(BP12) and Hpare Hkyer-BP-6.

3.1.1 Determination of the Sample Size

To get the required sample size, the following formula of Cochran's formula is used as follows.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where $n_0 = \frac{Z^2 P(1-P)}{e^2}$

N = population size = 1279
Z = 95% confidence level = 1.96
e = desired level of precision = 6.2%
P = population proportion (if unknown, 0.5)

$$n_0 = \frac{(1.96)^2(0.5)(1-0.5)}{(0.062)^2} = 250$$

$$n = \frac{250}{1+\frac{(250-1)}{1279}} = 209$$

There were 1279 households in 5 camps in Kachin State. The required sample size was at least 209 households. The sample size is allocated to each selected camp by using proportional to allocation as follows.

$n_i = n(\frac{N_i}{N})$

$n_1 = n(\frac{N_1}{N}) = 209(\frac{294}{1279}) = 48$

$n_2 = n(\frac{N_2}{N}) = 209(\frac{465}{1279}) = 76$

$n_3 = n(\frac{N_3}{N}) = 209(\frac{196}{1279}) = 32$

$n_4 = n(\frac{N_4}{N}) = 209(\frac{239}{1279}) = 39$

$n_5 = n(\frac{N_5}{N}) = 209\left(\frac{86}{1279}\right) = 14$

The total number of households and the corresponding sample household of the selected camps are shown in the following table.

Table (3.1) Listed of Selected Camps and Number of Households in Kachin State

Name of Camp	No: of Household	No: of Sample Household
Sha It yang	294	48
Maga Yang	465	76
Pajau / Jan Mai	196	32
Hkau Shaung (BP 12)	239	39
Hpare Hkyer - BP6	86	14
Total	1279	209

Data Source: Post Distribution Monitoring Report from Oxfam, INGO

From the above Table (3.1), total sample household 209 is calculated by 6.2 % margin of error and 95%confidence level. To obtain sample 209 HH, 48 sample HH from 294 distributed HH in Sha it yang camp, 76 sample HH from 465 distributed HH in Maga Yang camp, 32 sample HH from 196 distributed HH, 39 sample HH from 239

distributed HH in Hkau Shaung (BP 12) camp, 14 sample HH from 86 distributed HH in Hpare Hkyer-BP6 camp have been selected respectively.

3.1.2 Sampling Design

This study is from the household survey conducted by Oxfam. Firstly, a structured questionnaire: closed-ended, multiple choice questionnaires were prepared and to the sample of households. Secondly, the camps in Kachin state are divided into 5 strata. Thirdly, a simple random sample of household is selected from each stratum. Finally, the sample households 209 were collected by using proportionate to size allocation random sampling method based on the number of distributed 1279 households in the IDP camps in Kachin State. Thus, if the number of distributed households were large the sample sizes from that village were large.

3.2 Measurement of Food Consumption Score

Food security is measured by Food consumption score. In this study, food consumption score is the dependent variable. Satisfaction and sufficient of food assistance, household demographic and economics are independent variables. The dependent variable was food consumption was measured that 'poor' recoded as '1', borderline recoded as '2' and acceptable recoded as '3'. Factors affecting measure of food consumption were used as independent variables such as satisfying with food quality, sufficient assistance of food, eating preferred food, eating fewer meals, expenditure in highest amount on food, women-headed household, marital status of household head, number of household members, household with migrant household members, income source. The selected independent variables with categories were presented in illustrated in Table (3.2)

Table (3.2): Measurement of the Study

Variables	Categories(recoded)	Variables	Categories(recoded)
Y	Food consumption	X_6	Women-headed household
	1 if Poor		1 if Yes
	2 if Borderline		0 if No
	3 if Acceptable	X_7	Marital status of household head
X_1	Satisfaction with food quality		1 if Currently married
	1 if Poor		2 if Not currently married
	2 if Fair	X_8	Number of HH member
	3 if Good		1 if Less than 6
X_2	Sufficient assistance of food		2 if 6 and above
	1 if Yes	X_9	Households with migrant HH members
	0 if No		1 if Yes
X_3	Eating preferred food		0 if No
	1 if Yes	X_{10}	Income source
	0 if No		1 if Only one income source
X_4	Eating fewer meals		2 if More than one income source
	1 if Yes		
	0 if No		
X_5	Expenditure in highest amount on food		
	1 if Yes		
	0 if No		

Source: Oxfam Survey

3.3 Procedure of Food Consumption Score

The followings are how to construct the Food Consumption Score. The frequency weighted diet diversity score or "Food consumption score" (FCS) is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey (WFP, 2008). There are standard weights for each of the food groups that comprise the food consumption score. Weighted sum of frequency of household consumption, a continuous variable with a possible range of 0 to 112. It is an indicator of household dietary adequacy focusing principally on macronutrients and energy. It indicates if people are having sufficient food intake to lead a nutritionally

balanced life. There is no single way to measure food security, the concept itself being rather elusive.

Analysis of food security generally uses food consumption as the entry point. Food consumption measured in kilocalories is the gold standard for measuring consumption, and often considered to be one of the gold standards for food security- but the collection of detailed food intake data is difficult and time consuming. The method is to have a standard food consumption data collection instrument and analysis approach that is flexible enough for different needs and contexts, while standard enough to have equally applicable analysis techniques and equally interpretable results, and also one that can be implemented in the field in a reasonable data collection and analysis timeframe. There are several alternative ways to collect and analyze food consumption information using indicators that are proxy for actual caloric intake and diet quality. Such proxies generally include information on dietary diversity, sometimes with the addition of food frequency. It has adopted this data collection tool measuring dietary diversity and food frequency - because several different indicators built on this sort of data have proven to be strong proxies for food intake and food security.

Analysis of dietary diversity and food frequency can be done in several ways, each with its own specific aims - looking at consumption from different angles, and with different strengths and weaknesses. Building composite scores which measure food frequency and/or dietary diversity is one of the more explored and tested methodologies. There are several other indicators found throughout the literature. It has taken a direction of food consumption measurement tailored to its own information needs. To further harmonize data analysis, standard methodologies have been introduced to analyze this food consumption data.

The food consumption score is a standardized and transparent methodology; repeatable standardized data analysis is possible within a dataset (one analyst can easily reproduce the FCS on a dataset identical to that created on the same dataset by another analyst). The methodology also gives a comparable analysis between datasets, although this does not imply that the score has the same meaning for all households in all contexts. The FCS is also able to capture both Dietary Diversity and Food Frequency.

As part of the baseline questionnaire, households are asked to state what food types they consumed in the last 7 days and the frequency of consumption of each type in

the last 7 days. Information does not need to be obtained on how many times a day each food type has been consumed. The respondents were instructed to include the food groups consumed by household members in the home, or prepared in the home for consumption by household members outside the home (e.g., at lunchtime in the fields.). Foods consumed outside the home that was not prepared in the home was not be included.

I. Using standard Vulnerability and Assessment Mapping, VAM 7-day food frequency data group all the food items into specific food groups (see groups in table below).

II. Sum all the consumption frequencies 4 of food items of the same group and recode the value of each group above 7 as 7.

III. Multiply the value obtained for each food group by its weight (see food group weights in table below) and create new weighted food group scores.

IV. Sum the weighed food group scores, thus creating the food consumption score (FCS).

V. Using the appropriate thresholds (see below), recode the variable food consumption score, from a continuous variable to a categorical variable.

FCS = (staple frequency x staple weight) + (pulse frequency x pulse weight) +
(vegetable frequency x veg weight) + (fruit frequency x staple weight) +
(animal frequency x animal weight) + (sugar frequency x sugar weight) +
(dairy frequency x staple weight) + (oil frequency x oil weight)

Source: FAO and WFP Guideline

The consumption frequency of each food group is multiplied by an assigned weight that is based on its nutrient content (see Food Groups and Weights able below).

Table (3.3-A): Weight of Food Items

Sr.	Food Items (Examples)	Food groups (definitive)	Weight (definitive)
1	Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals Cassava, potatoes and sweet potatoes, other tubers, plantains	Main staples	2
2	Beans. Peas, groundnuts and cashew nuts	Pulses	3
3	Vegetables, leaves	Vegetables	1
4	Fruits	Fruit	1
5	Beef, goat, poultry, pork, eggs and fish	Meat and fish	4
6	Milk yogurt and another diary	Milk	4
7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	Spices, tea, coffee, salt, fish power, small amounts of milk for tea.	Condiments	0

Source: World Food Program's Food Consumption Score

3.4 Determination of the Weight

When creating a composite scoring system for dietary diversity (with or without the added dimension of food frequency), the choice of weights is obligatory and subjective. Weights are typically constant across analyses in order to have a better degree of standardization of the tool. For example, in the HDDS (Household Dietary Diversity Score) described by FANTA13, the weight of each of the food groups is 1, giving equal importance in the calculation of the HDDS to the sugar/honey group and meat/poultry/offal group. The determination of the food group weights as described in the calculation of the FCS is based on an interpretation by a team of analysts of 'nutrient density'14. This concept has been applied in other dietary diversity indicators, such as that used by SADC15, C-SAFE, as well as researchers in Zambia16. Although subjective, this weighting attempts to give greater importance to foods such as meat and

fish, usually considered to have greater 'nutrient density' and lesser importance to foods such as sugar. It is not yet known if these weights are appropriate universally. However, at this time it is recommended that the weights remain constant to provide a more standardized methodology. As research continues, further support may be lent to these weights, or it may be found best to modify them in either a universal or context specific manner. The guiding principle for determining the weights is the nutrient density of the food groups. The highest weight was attached to foods with relatively high energy, good quality protein and a wide range of micro-nutrients that can be easily absorbed. Currently, the weights recommended by VAM are calculated based on the following logic:

Table (3.3-B): Weight of Food Items and Justification

Sr.	Food Items	Food groups (definitive)	Weight	Justification
1	Maize, maize porridge, rice, sorghum, millet pasta, bread and other cereals Cassava, potatoes and sweet potatoes, other tubers, plantains	Main staples	2	Energy dense/usually eaten in larger quantities, protein content lower and poorer quality (PER17 less) than legumes, micro-nutrients (bound by phytates).
2	Beans. Peas, groundnuts and cashew nuts	Pulses	3	Energy dense, high amounts of protein but of lower quality (PER less) than meats, micro-nutrients (inhibited by phytates), low fat.
3	Vegetables, leaves	Vegetables	1	Low energy, low protein, no fat, micro-nutrients
4	Fruits	Fruit	1	
5	Beef, goat, poultry, pork, eggs and fish	Meat and fish	4	
6	Milk yogurt and another diary	Milk	4	
7	Sugar and sugar products, honey	Sugar	0.5	
8	Oils, fats and butter	Oil	0.5	
9	Spices, tea, coffee, salt, fish power, small amounts of milk for tea.	Condiments	0	These foods are by definition eaten in very small quantities and not considered to have an important impact on the overall diet.

Source: World Food Program's Food Consumption Score

Depending on whether the population falls into a typical threshold category will vary as demonstrated in the table below:

Table (3.4): Food Consumption Threshold

Food Consumption Typical Threshold	Profiles
0-21	Poor
21.5 -35	Borderline
>35	Acceptable

Source: World Food Program's Food Consumption Score

3.5 Process of Quality Control on the Food Security Survey

Beyond ensuring the quality of the questionnaire, enumerator training, and field supervision, the consumption patterns of the individual foods were explored for logical inconsistencies after cleaning. For example, large numbers of households not consuming starchy foods, or fish eaten in non-fish-eating areas (possibly through the misinterpretation of fish powder spice/condiment as fish consumption) are examples of inconsistencies to examine. The distribution of the FCS has been checked, usually it, is near normal with a slight skew, although in certain contexts where diets are very homogeneous (such as a refugee camp) a strong mode may be observed. Validation of the FCS against other proxies of food consumption has been run (usually Pearson or Spearman correlations to compare FCS to percent of expenditures on food, total cash expenditures, total cash expenditures on food, Wealth Index, number of meals eaten yesterday, Coping Strategies Index, asset index). The values of the coefficient for these tests were all (or nearly all) significant and generally fall between 0.2 and 0.4.

3.6 Pearson's Chi-square Statistic

To testify whether there is association between two variables with qualitative attributes, Pearson's Chi-square statistic is used. It is a non-parametric (distribution free) tool designed to analyze group differences when the dependent variable is measured at a nominal level. Like all non-parametric statistics, the Chi-square is robust with respect to the distribution of the data. Specifically, it does not require equality of variances among

the study groups or homoscedasticity in the data. It permits evaluation of both dichotomous independent variables, and of multiple group studies. Unlike many other non-parametric and some parametric statistics, the calculations needed to compute the Chi-square provide considerable information about how each of the groups performed in the study. This richness of detail allows the researcher to understand the results and thus to derive more detailed information from this statistic than from many others. (Miller R, Siegmund D. Maximally selected Chi-square statistics. Biometrics)

The Chi-Squares test is a non-parametric statistic, also called a distribution free test. Non-parametric tests should be used when any one of the following conditions pertains to the data:

1. The level of measurement of all the variables is nominal or ordinal.

2. The sample sizes of the study groups are unequal; for the χ^2 the groups may be of equal size or unequal size whereas some parametric tests require groups of equal or approximately equal size.

3. The original data were measured at an interval or ratio level but violate one of the following assumptions of a parametric test:

(a) the distribution of the data was seriously skewed or kurtotic (parametric tests assume approximately normal distribution of the dependent variable), and thus the researcher must use a distribution free statistic rather than a parametric statistic.

(b) The data violate the assumptions of equal variance or homoscedasticity.

(c) the continuous data were collapsed into a small number of categories, and thus the data are no longer interval or ratio.

The formula for calculating a Chi-Squares is:

$$\chi^2 = \sum \frac{(Oi - Ei)^2}{Ei}$$

where,

O_i is Observed (the actual count of cases in each cell of the table)

E_i is Expected value (calculated below)

χ^2 is The cell Chi-square value

The Chi-square is a significance statistic and should be followed with a strength statistic. The Cramer's V is the most common strength test used to test the data when a significant Chi-square result has been obtained. Advantages of the Chi-square include its robustness with respect to distribution of the data, its ease of computation, the detailed information that can be derived from the test, its use in studies for which parametric assumptions cannot be met, and its flexibility in handling data from both two group and multiple group studies. Limitations include its sample size requirements, difficulty of interpretation when there are large numbers of categories (20 or more) in the independent or dependent variables, and tendency of the Cramer's V to produce relative low correlation measures, even for highly significant results. (Scott M, Flaherty D, Currall J)

3.7 Ordered Logistic Regression Model

This section reviews the existing literature on statistical model from National Library of Medicine, Official website of United States Government. The multiple linear regression model was used where a continuous outcome variable, Y, is regressed on an explanatory variable, X. But, instead, if the observed Y is not continuous it is a collapsed version of an underlying unobserved variable, Y* (Long & Freese, 2014). As people cut thresholds on this underlying variable their values on the observed ordinal variable Y get different.

Suppose Y_i is an ordinal response variable with J categories for the i^{th} subject with a vector of Out covariates xi. A regression model investigates a relationship between the covariates and the set of probabilities of the categories pji=Pr(Yi =yj| xi), j=1,…,J. Typically, the regression models for the variables with ordinal responses are not described in terms of probabilities of the categories; instead, they refer to convenient one-to-one transformations, such as the cumulative probabilities $g_{ji}=Pr(Yi \leq y_j| x_i)$, j=1,…,J. It is noted that the last cumulative probability is necessary to be 1; therefore, the model produces only J−1 cumulative probability. An ordered logit model for Y_i with the J ordinal response categories is identified by a set of J−1 equations where the cumulative probabilities $g_{ji}=Pr(Y_i \leq y_j| x_i)$ are related to a linear predictor $\beta'x_i = \beta_0+\beta_1x_{1i}+\beta_2x_{2i}+\ldots$ through the logit function:

$$\text{logit}(g_{ji}) = \log(g_{ji} /(1- g_{ji})) = \alpha_j - \beta'x_i \text{ , } j= 1,2,\ldots,J-1 \qquad (3.2)$$

The vector of the slopes β is not indexed by the category index j, thus the effects of the covariates are the same across the response categories. This feature holds the parallel assumption: indeed, plotting logit(g_{ji}) against a covariate produces J−1 parallel lines or parallel curves in case of a non-linear. In model (1), the minus sign before β indicates that rise in a covariate with a positive slope is associated with a shift towards the right-end of the response scale, namely an increase of the of the higher categories. Some authors write the model with a plus before β: in that case the interpretation of the effects of the covariates is reversed. From equation (1), the cumulative probability for category c is

$$gci = \exp(\alpha c - \beta' xi)/(1+\exp(\alpha c - \beta' xi)) = 1/(1+\exp(-\alpha c + \beta' xi)) \qquad (3.3)$$

The parameters α_j, namely thresholds or cut-points (hereafter use thresholds), are in ascending array ($\alpha_1 < \alpha_2 < \ldots < Y_i * \leq \alpha_j *$. It follows that a cumulative model for an ordinal variable, such as the ordered logit model (1), is kept equal to a system composed of a set of thresholds or cut-points α_j * and a linear regression line for an underlying variable with the continuous response is:

$$Y_i * = (\beta *)' x_i + e_i * \qquad (3.4)$$

where e_i * is an error with mean zero and standard deviation σe*. The relationship Pr($Y_i \leq y_j$) = Pr($Y_i * \leq \alpha_j *$) implies that the linear model (3) is equivalent to the cumulative model l (g_{ji})=$\alpha_j - \beta' x_i$, where the link function l(·) is the inverse of the distribution function of the error e_i*. The relationship between a parameter of the cumulative model θ and the corresponding parameter of the underlying model θ * is θ = θ * σl/σe*, where σl is the standard deviation of the distribution associated to the link function (e.g. σl =1 for probit and σl = $\pi/\sqrt{3} \cong 1.81$ for logit). Therefore, specifying the link function of the cumulative model amounts to specifying the distribution of the error of the underlying model and thus fixing its standard deviation to a conventional value: the probit corresponds to a standard normal error so the standard L. Grilli, C. Rampichini: Ordered logit model 3 deviation is fixed to 1, whereas the logit link corresponds to a standard logistic distribution so the standard deviation is fixed to $\pi/\sqrt{3} \cong 1.81$. Indeed, the measurement unit of the underlying model is undefined since Pr($Y_i * \leq \alpha_j *$)= Pr(cYi * ≤ kαc *) for any constant c, thus the standard deviation σe* is not identifiable. This indeterminacy is solved in the cumulative model (1) since its parameters are measured on

a conventional scale defined by the link (the standard deviation of the error does not appear as a parameter). The change of scale is the reason why the estimated regression coefficients from an ordered logit model are about 1.81 times the values from an ordered probit model. The representation through an underlying linear model also makes clear that the estimated slopes from a cumulative model are approximately invariant to merging of the categories.

The proportional odds model can be understood as an extension of Logistic Regression or, as proposed by Collet (2003), a "generalisation of the Logistic Regression". Therefore, calculation and interpretation of the model parameters is the same as for the Logistic Regression for binary response data. The technique allows one to model ordered data by converting the data into a number of dichotomies. A binary Logistic Regression models one dichotomy whereas the proportional odds model uses a number of dichotomies. The ordered data are arranged as a series of binary comparisons. For the dataset of this project, a three-category ordered variable (coded 1, 2, 3) is represented as two comparisons: (a) Category 1 compared to categories 2 and 3; (b) Categories 1 and 2 compared to category 3. Such method of modelling is referred to as all possible Logistic Regression model (see Collet, 2003: p. 325-6).

The proportional odds model, abbreviated POM, of a relationship between *m* independent variables each with *h* levels and one response variable with k ordered categories is derived by Collet (2003: p. 325-9). In this text, the *k* ordered categories of the response variable Y, are denoted by $C_1, C_2, \ldots, C_k$, where $k \geq 2$ and where a response in category *Cj* can be described as "worse than" one in , if . Thus for the food consumption score with the responses (or outcomes) labelled as "poor", "borderline poor" or "good", the categories would be C_1, C_2 and C_3 so that $C_1 > C_2 > C_3$.

If this is a categorical response variable for the *i*th household with *k* levels, it turns out that takes the value *j* if the response is in category *Cj*, *j=1,2…,k*. If denotes a value of an explanatory (or independent) variable X, the probability that the *ith* household responds in category *Cj*, is denoted by , such that

$$Pij=P(\ Yi=j) = P[\text{household i responds in category Cj}].$$

It follows that, the cumulative probability of a response in category Cj or worse, denoted as

Yij = pi1+pi2+…+pij is . As a result, $\sum_{j=1}^{k} Pij = Yik = 1$(Collet, 2003).

More understanding of the theory on formulation of the Proportional Odds Model (other texts use 'Cumulative Odds Ratios ') can be found in Agresti (2002), McCullagh (1980), Peterson and Harrel (1990).

3.8 The Odds Ratio

Prior to defining the *odds ratio*, it is needed to define what is meant by "*odds*". "The odds of a success", which is defined as the ratio of the probability of "success" over the probability of "failure" (Collet, 1991). The odds of success in group *0* are $(\Phi_0)/(1-\Phi_0)$, and the odds of success in group 1 are $(\Phi_0)/(1-\Phi_0)$. In comparing the two groups, the odds of a success in group 1 relative to group 0 are:

$$\Psi=\frac{(\Phi 1)(1-\Phi 1)}{(\Phi 0)(1-\Phi 0)}$$

In interpreting this statistic, when $\Psi > 1$, the odds of success favour group 1 than group 0 and when $\Psi < 1$, the odds ratios of observing a success are more in group 0 than in group 1. Hence, the odds ratio is the measure of the difference between two success probabilities related to two comparable groups (Collet, 1999). It follows that the estimate of the odds ratio is given by

$$\Psi=\frac{(\Phi 1)(1-\Phi 1)}{(\Phi 0)(1-\Phi 0)}$$

and the odds ratios of a success are Ψ times more (or less) in group 1 than in group 0. If $\Psi \approx 1$, (i.e. Ψ is very close to 1), it can be interpreted that there is no change in odds between the two groups, suggesting there is no association between group of households and the response/outcome variable. Evidently if $\Psi > 1$, the odds of success in group 1 relative to group 0 are more and similarly, if $\Psi < 1$, the odds are less in group 1 relative to group 0 (i.e. they are more in group 0). In both cases of the inequality to unity, there is suggestion of an association between the explanatory variable and the response variable.

The value of ψ tends to be normal on the logarithmic scale for a large sample. Hence, when the individual or a household's responses are not known, the odds ratio is better defined in terms of *log-odds ratio* (Collet, 1991). If it is denoted to the odds ratio by θ, then

$$\Psi=\ln(\psi)=\ln[\frac{(\Phi 1)(1-\Phi 1)}{(\Phi 0)(1-\Phi 0)}]$$

The standard error of the log-odds ratio is that shown by Woolfe (1955) and Schlesselman (1982) as

$$\text{se}\,(\ln(\psi)) = \sqrt{\frac{1}{R1} + \frac{1}{(n1-R1)} + \frac{1}{R0} + \frac{1}{(n0-R0)}}$$

The 95% confidence interval for $\ln(\psi)$ is $\ln(\psi) \pm 1.96\text{se}(\ln(\psi))$. Then the 95% confidence interval (CI) for ψ is obtained by taking the exponents of the lower and upper limits. It is simpler to calculate the estimate of the odds ratio and the chi-square statistic, from values of the efficient score and Fisher's information as obtained in the following Sub-sections.

3.9 Testing for the Significance of the Model

Testing for significance of a model is the act of assessing the model to see how good it fits (other texts express it as *goodness of fit of a model*). It is best practice to investigate how the fitted values compare with the observed values, which act either require to be revised or accepted (Collet, 1991). In Logistic Regression the process usually involves testing for the significance of the *k* coefficients of explanatory variables (factors) using the *likelihood ratio test* based on the *statistic G* (Hosmer & Lemeshow, 2000) or *D statistic*, otherwise known as the *Deviance* (Collet, 1991, p.63).

The Logistic Regression model aims at testing the hypothesis that there is no difference between the levels of the prognostic factor with regard to the outcome variable, i.e. there is no advantage of one group over the other.

The *likelihood ratio test* (LRT) is a statistical test of the *goodness-of-fit* between two models. A relatively more complex model is compared to a simpler model to see if it fits a particular dataset significantly better. If we establish that there is good fit, the additional parameters of the more complex model are often used in subsequent analyses. This test is only valid if used to compare *hierarchically nested models* (Collet,1991: p.68) That is, the more complex model must differ from the simple model only by the addition of one or more parameters. Adding additional parameters will always result in a higher likelihood score. However, there comes a point when adding additional parameters is no longer justified in terms of significant improvement in fit of a model to a particular dataset (Cox and Snell, 1989). The LRT provides one objective criterion for

selecting among possible models. The LRT begins with a comparison of the likelihood scores of the two models. In other words, the LRT compares the *deviances* values of two models. The LRT is based on the change in the deviance of the model with the factor fitted and that of the model with only the intercept fitted. Hence, if the deviance for the model with the prognostic factor fitted is $D(\Theta)$ and the deviance for the model with only the intercept fitted, i.e. $\Theta=\beta=0$, is *D(0).* The likelihood ratio (LR) is expressed as

$$LR= D(\Theta)-D(0)=-2[\log L(0)-\log L(\Theta)]$$

where $-2\log L=-2l(\Theta)$ is the deviance of the model with factor from that without the factor i.e. the *null model* (Collet, 2003).

The Likelihood Ratio statistic approximately follows a *chi-square* distribution (Collet, 2003, Hosmer and Lemeshow, 2000, McCullagh and Nelder, 1989). To determine if the difference in likelihood scores between the two models is statistically significant, it must also consider the degrees *of freedom*. In the Likelihood Ratio Test, degrees of freedom are equal to the number of the additional parameter in the model with a factor. Obviously, there is only 1 degree of freedom since there is only one parameter in the model with one factor. Using this information, can be determined the critical value of the test statistic from standard statistical tables.

CHAPTER IV

DATA ANALYSIS

This chapter illustrates the demographic and economic characteristics of the respondents; background of food assistance, food consumption and food security; association between food security and each of independent variables; and investigating whether food and cash distribution have an impact on food security. Furthermore, order logistic regression model are used to meet its objectives.

4.1 Demographic Characteristics of Respondents

The demographic characteristics of the study participants included such as women-headed household, marital status of household head, number of household members, household with migrant and household with sick. The demographic characteristics are shown in Tables (4.1), (4.2), (4.3), (4.4) and (4.5).

Table (4.1): **Frequency Distribution of Women-headed**

Women-headed	Frequency	Percent (%)
Yes	68	32.54
No	141	67.46

Source-Oxfam Survey Data

Table (4.1) presents the respondents about one-third, 32.54%, were residing in women-headed households and about two-third, 67.46%, were residing in Men Headed households. Therefore, Men headed household respondents are more than two times of women headed household respondents.

Table (4.2): Frequency Distribution of Marital Status of Household Head

Households Heads	Frequency	Percent (%)
Currently married	193	92.34
Not currently married	16	7.66

Source-Oxfam Survey Data

From Table (4.2), most of the Households Heads (92%) are currently married and a few household heads (8%) are not currently married. Therefore, it can be said that married respondents are more than single respondents and a few respondents are not currently married.

Table (4.3) Frequency Distribution of Household Members

Household Members	Frequency	Percent (%)
1-4	70	33.49
5-8	108	51.67
9-13	31	14.83

Source-Oxfam Survey Data

There are classified into 3 different age groups of household members such as 1-4, 5-8 and 9-13, respectively. According to Table (4.3), the sample 209 respondents, nearly 33% were 1-4 household members, 51% were 5-8 household members and 15% were 9-13 household members. Therefore, it can be observed that the household with 5 to 8 household members had the highest and 9 to 13 household members had the lowest.

Table (4.4) Frequency Distribution of Household with Sick People

Household members with sick people	Frequency	Percent (%)
Yes	43	20.57
No	166	79.43

Source-Oxfam Survey Data

Table (4.4) shows 20% were sick people in household members and nearly 80% were not sick people in household members. Therefore, one-fifth of the respondents were sick people and more than four times were not sick people.

Table (4.5) Frequency Distribution of Households with Migrants

Migrants	Frequency	Percent (%)
Yes	59	28.23
No	150	71.77

Source-Oxfam Survey Data

The frequency distribution of household with migrants is illustrated in Table (4.5). Nearly 30% of the respondents were migrants and 70% of the respondents were not migrants. The respondents of migrant persons were more than two times of not migrant persons. Therefore, it can be concluded that most of the respondents were migrant persons.

4.2 Economic-Characteristics of Respondents

The economic characteristics of the study participants included such as average monthly income in Yuan, sources of income, a household with people who are not workable and household with debt. The economic characteristics are shown in Table (4.6), (4.7), (4.8) and (4.9).

Table (4.6) Frequency Distribution of Monthly Household Income Sources

Number of Income source	Frequency	Percent (%)
Only one source	82	39.23
More than one source	127	60.77

Source-Oxfam Survey Data

In Table (4.6), 39.23% of the surveyed Households have only income source and 60.77% have more than one income source.

Table (4.7) Frequency Distribution of Household with People who cannot Work

Can not work	Frequency	Percent (%)
Yes	52	24.88
No	157	75.12

Source-Oxfam Survey Data

For Table (4.7), 24.88% of the surveyed Households have people who cannot work as they have been sick continuously for the past three months, and 75.12% of the Households did not have this kind of person.

Table (4.8) Frequency Distribution of Household with Debt

Debt	Frequency	Percent (%)
Yes	87	41.63
No	122	58.37

Source-Oxfam Survey Data

For Table (4.8), 41.63% of survey Households have debt and this is nearly half of the total surveyed households.

Table (4.9) Frequency Distribution of Maximum income and Minimum income

Monthly Income (Yuan)	Frequency	Percent (%)
Maximum Amount (1500)	2	1
Minimum Income (0)	21	10

Source-Oxfam Survey Data

Table (4.9) shows that only 1% of households have 1500 Yuan, which is the maximum account, and 10% of Households have 0 Yuan, which is the minimum account.

The demographic and socio-economics characteristics are summarized in the following table.

Table (4.10) Demographic and Economic Characteristics

Demographic Characteristics	**%**	**Economic Characteristics**	
Women-headed (n= 209)		**Monthly HH Income (n=204)[1]**	
Yes	32.54	Mean (in Yuan)	241.08
No	67.46	Mean (in Kyats)	46528
Marital Status of Household head (n=209)		Median (in Yuan)	240
Currently married	92.34	Median (in Kyats)	46320
Not currently married	7.66	SD in Yuan	172.69
Household Members (n=209)		Min: Max (in Yuan)	0: 1500
1 – 4	33.49	Min: Max (in Kyats)	0:289500
5 – 8	51.67	**Sources of Income**	**%**
9 – 13	14.83	Only one source	39.23
Household with sick people (n= 209)		More than one source	60.77
Yes	20.57	**Household with people who cannot work (n=209)**	
No	79.43	Yes	24.88
Household with migrants (n=209)		No	75.12
Yes	28.23	**Household with Debt (n=209)**	
No	71.77	Yes	41.63
		No	58.37

Source: Oxfam Survey Data

From this table (4.10), it is noted that of the respondents, about one-third, 32.54%, were residing in women-headed households. The households with 5 to 8 househ

[1] Trimmed mean value because outliers were excluded.

old members had the highest proportion whilst those with 9 to 13 ones had the lowest. Nearly 21% said that their households had people where have got sick in the past 3 months. Regarding economic characteristics, the average monthly household income was about 241 Yuan (about 45000 Kyats) with a maximum income of 1500 Yuan (nearly 290000 Kyats) and standard deviation (SD) of 172.69 Yuan.

4.3 Background of Food Assistance, Food Consumption, and Food Security

Food assistance means rice assistance. Besides, food security is measured in terms of food consumption scores (hereafter, FCS) and categorized those scores with three thresholds: poor ranging from 0 to 21 scores, borderline ranging from 21.5 to 35; and acceptable, ranging scores higher than 35 (WFP, 2008).

According to Table (4.12), About 16% of the respondents revealed that the receiving food was insufficient, and 93.3% had the highest amount of food. Of the respondents, about 64% said that they were satisfied with the quality of food assistance. Those with a poor level of satisfaction were found to be the lowest, 4.31%. Concerning food consumption, the households which ate fewer meals, 36.36% were found to be lower than those which did not d 63.64%, Meanwhile, those who could not eat the kinds of foods they preferred had a higher proportion than those who could. Nearly 12 percent of the households who have eight times cannot eat the preferred food in the past four weeks. Sixty-four percent of the respondents said the rice quality is good, 32% of the respondents reported it as fair, and 4% of respondents informed that it is poor. In terms of food security, the average FCS score was 56.29. It indicates that food was secure at an acceptable level. This is confirmed by the highest proportion with an acceptable level of food security, 93.78%.

Table (4.11): Background of Food Assistance, Food Consumption and Food Security

Food Assistance	Number	%	Food Security		
Sufficient assistance of food (n=209)			**Average FCS score (n=185)[2]**		56.29
Yes	175	83.73	SD		15.47
No	34	16.27	Min : Max		13:149.5
Satisfaction with food quality (n= 209)					
Good	134	64.11	**FCS Group (n= 209)**	**Number**	**%**
Fair	66	31.58	Poor	4	1.91
Poor	9	4.31	Borderline	9	4.31
Food Consumption (n= 209)			Acceptable	196	93.78
Fewer meals					
Yes	76	36.36			
No	133	63.64			
Eating preferred food					
Yes	184	88.04			
No	25	11.96			
Expenditure in highest amount on Food (n=209)					
Yes	14	93.30			
No	195	6.70			

Source: Oxfam Survey Data

4.4 Association between Food Security and Food Assistance, Socio-Economic and Demographic Factors

In this study, Binary analysis is conducted to determine whether food security is associated with food assistance and socio-economic and demographic characteristics. Based on findings, food security is presented in terms of an acceptable level. Sufficient assistance of food and the respondent's satisfaction with food quality are used as proxy variables of food assistance.

According to Table (4.13), as the result of $\chi 2$, the p-value > 0.05, there is no sound evidence that food security was statistically significant difference between households with and without sufficient food. Similarly, as the result of $\chi 2$, the p-value is 0.289, food security is not also statistically associated with satisfaction with quality of food assistance. Perhaps, this is because they might be just eating the food assistance although the IDPs are not satisfied with food quality, since they may not have chance to hunt other qualified food apart from the food assistance. Although food consumption

[2] Trimmed mean value because outliers were excluded.

cannot be explained food security, amount of expenditure spent for food has association with food security. In this regard, the households with high amount of expenditure on food had a highly significantly than those without spending high amount.

Surprisingly, women-headed households had higher probability of food security than men-headed ones with statistical significance of p-value < 0.05. Besides, marital status of household head is statistically significant on determinant of food security. The food was found more secure in the households with currently married household-head.

Economic characteristics of the IDPs (p-value < 0.05) are statistically significant role for securing the food. As the household income and income sources have p-value 0.02, are significant factors for securing the food.

Table (4.12-a): Association between Food Security and Food Assistance, Socio-Economic Demographic Factors

Explanatory Variables	Food security (%)	$\chi 2$	p-value
Food Assistance and Food consumption			
Sufficient assistance of food			
Yes	93.14	0.9994	0.607
No	97.06		
Satisfaction with food quality			
Good	91.04	4.9817	0.289
Fair	98.48		
Poor	100		
Food Consumption			
Fewer meals			
Yes	94.74	0.2706	0.873
No	93.23		
Eating preferred food			
Yes	93.48	0.5646	0.754
No	96.00		
Expenditure in highest amount on food			
Yes	96.41	34.6649	**0.000**
No	57.14		
Demographic Characteristics			
Women-Headed household			
Yes	97.16	8.59	**0.014**
No	86.76		

Source: Oxfam Survey Data

Table (4.12-b): Association between Food Security and Food Assistance, Socio-Economic Demographic Factors

Explanatory Variables	Food security (%)	$\chi 2$	p-value
Marital status of household head			
Currently married	94.3	10.9644	**0.004**
Not currently married	87.5		
Household members			
1 to 4	90	4.6209	0.328
5 to 8	96.3		
9 to 13	93.55		
Economic Characteristics			
Monthly HH income in Yuan			
Less than 200 (Less than 3864 Kyats)	87.06	12.2463	**0.016**
200 to 399 (3864 to 7716 Kyats)	97.18		
400 and above (77209 Kyats and above)	100		
Income Source			
Only one source	86.59	12.548	**0.002**
More than one source	98.43		

Source: Oxfam Survey Data

4.5 Effect of Food Assistance on Food Security

In this study, order logistic regression analysis as multivariate statistical analysis is applied because food security, the dependent variable, is a categorical variable with ordered responses. When employing the ordered logistic regression analysis, it is very sensitive to extremely high correlations among the independent variables to each other.

4.5.1 Ordered Logistic Regression Diagnosis Test

The ordinal logistic regression model has an important assumption that belongs to ordinal odds. This assumption holds that parameters should not change for different categories. In other words, correlation between independent variable and dependent variable does not change for dependent variable's categories, and parameter estimations do not change for cut-off points. This assumption states that the dependent variable's

categories are parallel to each other. When the assumption does not hold, it means that there are no parallelity between categories. Likelihood Ratio Test, Wald Chi-Square test and the other related tests are used to test parallel lines assumption (Long, 1997; Agresti, 2002). In ordinal logit regression, these tests are used to examine the equality of the different categories and decide whether the assumption holds or not. If the assumption does not hold, interpretations about results will be wrong, therefore in order to find correct results alternative models are used instead of ordinal logit regression models.

The following null hypothesis tests whether β_k coefficients of independent variable are equal or not for every single category.

$$H_0: = \beta_{1j} = \beta_{2j} = \cdots = \beta_{(k-1)j} = \beta$$

According to the results, p-value which is greater than 5% indicates that the parallel line assumption is held.

Table (4.13) Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	67.171			
General	59.735	7.437	12	0.827

Source-Oxfam Survey Data

4.5.2 Model Fitness

The statistically significant chi-squared statistic (p-value=0.000<0.001) suggests that the final model gives significant improvement over the baseline intercept-only model. Besides, the Pearson's chi-squared test does not reject that the fit is good with the larger p-value. Nagelkerke and McFadden R-squared, show that more than 40% of the variation in dependent variable can be explained by the independent variables the study took consideration of. Therefore, the proposed model is fit to investigate the effect of food and cash assistance on food security.

Table (4.14): Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	113.434			
Final	67.171	46.263	12	0.000

Source-Oxfam Survey Data

Table (4.15): Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	377.288	398	0.765
Deviance	67.171	398	1.00

Source-Oxfam Survey Data

Table (4.16): Pseudo R-Square

Cox and Snell	0.199
Nagelkerke	0.474
McFadden	0.408

Source-Oxfam Survey Data

4.5.3 Effect of Food and Cash Assistance on Food Security

First of all, consistent with binary analysis, satisfaction with food assistance quality did not have association with food security. On the contrary, those spending high amount of money on food are 6% times more likely to have acceptable food security than those not spending with significance level of 10%.

Table (4.17): Effect of Food Assistance on Food security

Independent Variables	OR	SE	p-value
Satisfaction with food quality			
Good (Ref)			
Fair	3.151731	3.788553	0.34
Poor	332225.4	4.04E+08	0.992
Sufficient assistance of food			
Yes (Ref)			
No	5.326314	7.044343	0.206
Eating preferred food			
Yes (Ref)			
No	1.053532	1.379571	0.968
Eating fewer meals			
Yes (Ref)			
No	2.032862	1.673834	0.389
Expenditure in highest amount on food			
No (Ref)			
Yes	5.614207	5.228183	**0.064**
Women-headed household			
No (Ref)			
Yes	2.343691	1.978287	0.313
Marital status of household head			
Currently married (Ref)			
Not currently married	0.471857	0.5989707	0.554
No of HH member			
Less than 6 (Ref)			
6 and above	1.46135	1.182959	0.639
Households with migrant HH members			
No (Ref)			
Yes	1.300705	0.719205	0.634
Monthly Household Income (Yuan)	1.010964	0.0048804	**0.024**
Less than 200 (Ref)			
200 to 399			
400 and Above			
No of source of income			
Only one income source (Ref)			
More than one income source	1.681944	1.651073	0.596

Source: Oxfam Survey Data

The above Table (4.18) shows that satisfaction with food quality , sufficient assistance of food , eating fewer meals, expenditure in highest amount on food, women-headed household , marital status of household head , no: of HH member , households

with migrant HH members , monthly household income, no: of source of income were significant or not predictors of food security.

According to the results, the monthly household income was statistically significant and satisfaction with food quality , sufficient assistance of food , eating fewer meals, and expenditure in highest amount on food, women-headed household, marital status of household head , no: of HH member , households with migrant HH members , no: of source of income were not significant at.

Hence, difference in likelihood of being food security was not found between households eating fewer meals and those not eating as well as between those eating preferred food and those not eating. Concerning difference in food security depending on sex of household heads, inconsistent with binary analysis and multivariate analysis did not provide any statistically significant evidence. Likewise, other household characteristics such as marital status of household heads, household members and households with migrant household members had similar findings. But, household economic characteristics were associated with food security. In this case, the higher the monthly household income, the higher the likelihood of having acceptable food security.

CHAPTER V
CONCLUSION

Around 805 million people around the world are facing extreme hunger, regardless of the fact that the world food production has doubled during the past three decades (FAO, 2014). More than three billion People over the world live on less than $2.50 a day. Whereas 1.3 billion people in the entire world face extreme poverty and survive on less than $1.25 a day. One billion children are victims of poverty worldwide. According to UNICEF, 22,000 children die each day due to undernourishment. More than 750 million people are in shortage of access to fresh drinking water. More than 2 billion people are facing micronutrient deficiencies (FAO, 2014).

Food insecurity is a great problem in South Asia. It is a main problem of all regions and countries around the world. In Myanmar, Kachin State has been suffering from arm conflicts. Due to conflicts, many local people become displaced and food insecurity problem. Hence, the food security of the beneficiaries in the Internal Displaced Peoples (IDPs) in Kachin State are studied in this thesis.

5.1 Findings

This study attempts to investigate how effect of Food and Cash Assistance Program for food security of the IDPs in Non-government Control Area, Waimaw township, Kachin State. This thesis describes the background of food assistance, food consumption and food security in the studied IDPs. In terms of statistical analysis, the study utilizes the univariate, bivariate and multivariate analyses. Regarding the univariate analysis, background information about the food assistance, food security and demographic and economic characteristics are analysed. Concerning the Bivariate analysis, Chi-Square test is used to investigate the association between food assistance and food security, demographic and socio-economic characteristics. In terms of the multivariate analysis, ordered logistic regression is applied to investigate the impact of food assistance on food security.

Concerning the demographic characteristics, only one-third of the households are women-headed households and more than 90% of households are currently married. More than half of the households have 5 to 8 household members and about 80% of the

households have no sick people. About 30% of the households are migrant to Wai Maw Township.

Regarding economic characteristics, almost 40% of the households have only one source of income and about one source of income and about one-fourth of the households have people who cannot work. More than 40% of the households are households with debt. Only 2 households have a monthly income of 1500 Yuan which is only 1% of the sample households whereas 21 households have no income which is 10% of the sample households.

According to the bivariate analysis, as unexpectedly, amount and quality of food assistance, and satisfaction with food assistance do not have any association with food security. Perhaps, this is because they might be just eating the food assistance although the IDPs are not satisfied with food quality since they may not have chance to hunt other qualified food apart from the food assistance. On the other hand, the households with higher spending on food have higher food security. Besides, it is found that the economic factors of the IDPs can interpret food security. Specifically, the household income source is a significant factor to secure the food.

In terms of the multivariate analysis, there is no evidence that food assistance is associated with food security, consistent with binary analysis. The economic scenarios of households play important role to improve their food security.

5.2 Recommendations

From the findings, it is recommended that the government and non-governmental organizations should create income generation activities programs or livelihood programs rather than providing food assistance. Otherwise, The IDP Households that have less income and have a large size of Households members should receive more food to increase food security. However, before implementing the programs, the organizations should conduct livelihood assessments in the IDPs camps. The further research study, especially qualitative research, should be implemented to provide the in-depth information behind the quantitative findings.

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Appendix (Questionnaire)

1. Date and Time of Data Collection –
2. Name of Camp/ Village -
    - Sha-lt Yaung
    - Manga Yaung
    - Hkau Shau
    - Pajau
    - Hpare Hkyer
    - Hkun Nawng Village
    - Law Pum Village
    - Lung Byen Village
    - N'bu Kawng Village
    - Nga Htaung Village
    - N'wan Village
    - Prang Bum Village
    - Sut Ring Village
    - Tang Lai Village
3. Name of Interviewer –
4. Gender of Respondent –
    1. Male
    2. Female
5. Gender of HH Head –
    1. Male
    2. Female
6. Marital Status of HH Head
    1. Married
    2. Single
    3. Widowed
    4. Divorced
7. Gender of Cash and Rice Collector
    1. Male
    2. Female

8. No of people (under 5 years) live in the HH Current - living

9. No of people (5 to 8 years) live in the HH Current - live

10. No of people (19 to 60 years) live in the HH Current -live

11. No of elderly people (over 60 years) live in the HH Current staying

12. No of migrant person (More than 6 months)

13. No of total Male live in the HH Current-live

14. No of total female live in the HH Current-live

15. No of Total HH members in the HH Current-live

16. How many have been sick continuously for the past three months?

17. How many people in HH cannot work due to health problem (illness, disability)?

18. What are your currently HH income sources?

1. Livestock product sales
2. Crop (and crop residue) sales
3. Local labour (agricultural labour, local herding, construction, brick making)
4. Salaried employment
5. Remittances (money sent by someone living outside the village/ camp)
6. Collected goods sales: wild foods, firewood, grass
7. Transport
8. Small business (village kiosks, milling, tea stall, agro-processing)
9. Other Cash Assistance (Not KBC)
10. Cash Assistance by KBC
11. Other

If the respondent day other, please type

19. Livestock product sales (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4….)

20. Crop (and crop residue) sales (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

21. Local labour (agricultural labour, local herding, construction, brick making)
(Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

22. Salaried employment (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

23. Remittances (money sent by someone living outside the village/ camp)
(Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

24. Collected goods sales: wild foods, firewood, grass (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

25. Transport (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

26. Small business (village kiosks, milling, tea stall, agro-processing)
(Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

27. Other Cash Assistance (Not KBC) (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

28. Cash Assistance by KBC (Please types as 1 for Major/ the most important income and give rating as 2, 3, 4,…..)

29. Other

30. What is the average HH monthly income (in the local currency, Yuan)?

50

31. In the past four weeks, were you or any household member not able to eat the kinds of foods that you preferred because of a lack of resources?

1. Yes
2. No

32. If Yes, How often did this happen?

1. Rarely (once or twice in the past four weeks)
2. Sometimes (three to ten times in the past four weeks)
3. Often (more than ten times in the past four weeks)

33. In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?

1. Yes
2. No

34. How often did this happen?

1. Rarely (once or twice in the past four weeks)
2. Sometimes (three to ten times in the past four weeks)
3. Often (more than ten times in the past four weeks)

35. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any Cereals (Rice, bread, rice noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?

- 0 No
- 1 Yes

36. How many days have you consumed that food in the last 7 days?

Any Cereals (Rice, bread, rice noodles, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?

0 1 2 3 4 5 6 7

37. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any Roots and tubers (potatoes, sweet potatoes, yams, manioc, cassava or any other foods)? made from roots or tubers?

- 0 No
- 1 Yes

38. How many days have you consumed that food in the last 7 days?

Any Roots and tubers (potatoes, sweet potatoes, yams, manioc, cassava or any other foods)? made from roots or tubers?

0 1 2 3 4 5 6 7

39. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Vegetables & leaves (tomatoes, salad, mustard leaves cabbage)?

- 0 No
- 1 Yes

40. How many days have you consumed that food in the last 7 days?

Vegetables & leaves (tomatoes, salad, mustard leaves cabbage)?

0 1 2 3 4 5 6 7

41. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any Fruits (mango, pineapple, rambutan, papaya etc)?

- 0 No
- 1 Yes

42. How many days have you consumed that food in the last 7 days?

Any Fruits (mango, pineapple, rambutan, papaya etc)?

0 1 2 3 4 5 6 7

43. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any beef, pork, lamb, goat, rabbit wild game, chicken duck, or other birds, liver, kidney, heart, or another organ meats?

- 0 No
- 1 Yes

44. How many days have you consumed that food in the last 7 days?

Any beef, pork, lamb, goat, rabbit wild game, chicken duck, or other birds, liver, kidney, heart, or another organ meat?

0 1 2 3 4 5 6 7

45. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any eggs?

- 0 No
- 1 Yes

46. How many days have you consumed that food in the last 7 days?

Any eggs?

0 1 2 3 4 5 6 7

47. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any fresh or dried fish or shellfish?

- 0 No
- 1 Yes

48. How many days have you consumed that food in the last 7 days?

Any fresh or dried fish or shellfish?

0 1 2 3 4 5 6 7

49. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any foods made from the pulse, beans, peas, lentils, or nuts?

- 0 No
- 1 Yes

50. How many days have you consumed that food in the last 7 days?

Any foods made from the pulse, beans, peas, lentils, or nuts?

0 1 2 3 4 5 6 7

51. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any cheese, yoghurt, milk, or other milk products?

- 0 No
- 1 Yes

52. How many days have you consumed that food in the last 7 days?

Any cheese, yoghurt, milk, or other milk products?

0 1 2 3 4 5 6 7

53. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any foods made with oil, fat, or butter?

- 0 No
- 1 Yes

54. How many days have you consumed that food in the last 7 days?

Any foods made with oil, fat, or butter?

0 1 2 3 4 5 6 7

55. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any sugar or honey?

- 0 No
- 1 Yes

56. How many days have you consumed that food in the last 7 days?

Any sugar or honey?

0 1 2 3 4 5 6 7

57. Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night.

Any other foods, such as condiments, coffee, tea?

- 0 No
- 1 Yes

58. How many days have you consumed that foods in the last 7 days?

Any other foods, such as condiments, coffee, tea?

0 1 2 3 4 5 6 7

59. Was the rice distribution sufficient to cover your household's needs?

1. Yes
2. No

If the rice is not sufficient, why?

60. Was the cash distribution sufficient to cover your household's basic food needs?

1. Yes

2. No

If the cash distribution is not sufficient, why?

61. How do you think about the quality of rice?

1. Good
2. Fair
3. Poor

62. If the quality of rice is poor, how?

63. What did you buy or use normally with the received cash?

- Rice
- Oil
- Salt
- Pulse
- Meat or Fish or Eggs
- Onion or Garlic
- Vegetables
- Fruits
- Education
- Medical
- Cloths
- Kitchen Kits
- Transportation
- Social and Religious
- Other food items

64. How much yuan has been spent on food items in last month?

65. In the past month what were the 4 greatest HH expenditure in order of importance? (1=most, 4=least)

1. Food
2. House equipment purchase
3. Clothes
4. Fuel

5. Agricultural inputs
6. Livestock
7. Other productive assets: tools, machinery
8. Health expenses
9. Education expenses
10. Social expenses (weeding, funerals)
11. Other (1)
12. Other (2)

If the respondent give other (1), please type

If the respondent give other (2), please type

If the respondent say food, Please give the score (1=most, 4=least)

If the respondent say House equipment purchase, Please give the score (1=most, 4=least)

If the respondent say clothes, Please give the score (1=most, 4=least)

If the respondent say fuel, Please give the score (1=most, 4=least)

If the respondent say agricultural inputs, Please give the score (1=most, 4=least)

If the respondent say livestock, Please give the score (1=most, 4=least)

If the respondent say other productive assets: tools, machinery, Please give the score (1=most, 4=least)

If the respondent say health expenses, Please give the score (1=most, 4=least)

If the respondent say education expenses, Please give the score (1=most, 4=least)

If the respondent say Social expenses, Please give the score (1=most, 4=least)

If the respondent say other (1), Please give the score (1=most, 4=least)

If the respondent say other (2), Please give the score (1=most, 4=least)

66. What about the quality of foods item what you or your HH members buy?
    1. Good
    2. Fair
    3. Poor

If the respondent say poor, why?

67. What would you prefer (All cash or cash + rice or In-kind)?
    1. Rice + Cash
    2. All in-kinds
    3. All Cash
68. Why do you think?

69. What kind of transportation do you usually use to collect the rice & cash?
    1. Walk
    2. Bicycle
    3. Motor Cycle
    4. Three wheels _ Motorcycle
    5. Car
70. How much did you spend on transport to and from the distribution sit?

71. How many hours did the collector usually take to travel to the distribution site?
    1. =< 30 minutes
    2. >30 minutes to 1 hour
    3. > 1 hour to 1:30 hours
    4. > 1:30 hours to 2:00 hours
    5. > 2 hours

72. Did the collector feel safe going to and coming back from the distribution site?
    1. Yes
    2. No

If the respondent said no, why?

73. How long did the collector have to wait at the distribution site to get cash & rice?

1. =< 30 minutes
2. >30 minutes to 1 hour
3. > 1 hour to 1:30 hours
4. > 1:30 hours to 2:00 hours
5. > 2 hours

74. Was there increased the price of daily main food items (the types of beans, eggs, oil, salt) after cash distribution?

1. Yes
2. No

If yes, why do you think?

75. Has control over the money caused conflict within your household?

1. Yes
2. No

If the respondent say Yes, why?

76. Are you aware the process of complaint feedback mechanism?

1. Yes
2. No

77. Have you or your HH members gave any feedback or complaint about the distribution process?

1. Yes
2. No

If yes, what kind of complaints?

Kind-of-complaints

78. Did you or your HH members hear any KBC staff from distribution ask IDPs for any item or service exchange? (Money, other goods, sexual service,...etc)

Hearing _ Favour_ from IDPs

1. Yes

2. No

If yes, what kind of exchange?

79. Did you or your HH members face any KBC staff from distribution as IDPs for any item or service exchange? (Money, other goods, sexual services,...etc)

1. Yes
2. No

If yes, what kind of exchange?

80. How do you or your HH members feel on "KBC staff treat the beneficiaries with respects"?

1. Very Satisfied
2. Satisfied
3. Neutrality
4. Disatisfied
5. Very Disatisfied

Why do you think?

Why do you think?

81. Rank the ease with which you collected your cash and rice. (Please select only one)

1. Good
2. Fair
3. Poor

Why do you think?

82. Does the HH have any debt?

1. Yes
2. No

83. How much debt approximately? (Cash for Amount/ Kg for Food Items)

If your HH have bebt, How are you doing?

84. Is rations card being available in the HH?

- Yes
- No

85. Review Rations Card and select the Recent Date (Received).
(Please type from the distribution record)

85(a) Number of Quantity for Rice (recent receive).
Please type from distribution record

86 (b) Amount of Cash (Recently receive).
Please type from distribution record

86 (c) Number of HH Members from Ration Cards (Recently updated)